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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,201

03/10/2005

Yoshiyuki Miyamoto

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

ROLLAND, ALEX A

ART UNIT

PAPER NUMBER

4172

MAIL DATE

DELIVERY MODE

04/29/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,201	Applicant(s) MIYAMOTO, YOSHIYUKI	
	Examiner ALEX ROLLAND	Art Unit 4172	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/10/05, 5/25/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Preliminary Amendment

1. Acknowledgment is made of applicant's submitting of preliminary amendment on March 10, 2005. Claims 1-7 have been amended. Claims 8-12 have been added. Claims 1-12 are currently pending for the prosecution on the merits.

Claim Rejections - 35 USC §103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen et al (US 5,993,697).

Cohen et al teaches a process for creating pentaheptite whereby:

graphite sheets are used as a starting material (col. 11, lines 46-47);

electron beam is directed along the plane of the graphite layers (col. 11, lines 12-15);

electron beam imparts energy to carbon atom in the lattice causing the bond to rotate and convert a region of four hexagons into a region of two pentagons and two heptagons (also know as pentaheptite) (col. 11, lines 3-6); and

after rotation, the pentaheptite material was subsequently annealed (col. 7, lines 35-45).

Specifically, during the process of bond rotation, as describe by Cohen et al, a vacancy is formed by the electron beam, the number of dangling bonds is reduced by energy provided by the electron beam, a graphite-like molecule is introduced after finishing its rotation, and a new bond is generated. This is supported by the resulting structure in both cases being identical (applicant's figure 5 and figure 5 of Cohen et al).

Cohen et al also teaches that this process may be preformed on carbon nanotubes as well as combinations of nitrogen and boron atoms (col. 11, lines 34-37 and col. 10, lines 28-33).

Even if Cohen's invention may not be based on one particular rotating atom method, Cohen also mentioned about that rotating atoms can be done by that strictly removing and reintroducing an atom from the carbon lattice is taught by Cohen et al (col. 11, lines 20-25). Therefore, one of ordinary skill in the art wanted to create the structure of Cohen et al by a different method it would have been obvious to try the

more energy intensive process of removing said atom(s) from the carbon lattice as taught by Cohen et al, followed by the well known process of relaxing to reduce dangling bonds, reinserting removed material, and securing the atom(s) in place.

Conclusion

2. No Claims are allowed. All pending claims are rejected for the reasons set forth above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEX ROLLAND whose telephone number is (571)270-5355. The examiner can normally be reached on Monday through Friday, 7:30 a.m. to 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ALEX ROLLAND/
Examiner, Art Unit 4172

/Vickie Kim/
Supervisory Patent Examiner, Art Unit 4172